produce. On the other hand, HSGs can be formed in less time in a warm wall reaction chamber; however, these HSGs have a relatively small average size. (See Applicant's specification from page 2, line 18 through the end of page 4, and Figs. 2 and 3 referred to therein).

The present invention can provide HSGs having a significantly larger average size than those produced in a warm wall chamber according to the prior art, and yet are produced in less time than it takes in the prior art using even a cold reacting chamber. In this regard, compare the grain structure produced when practicing the present invention, as shown in Fig. 6B, to that produced according to the prior art, as shown in Fig. 6A. Also see Figs. 2, 3 and 5, respectively showing the relative time periods required to produce HSGs using a cold reaction chamber according to the prior art, a warm reaction chamber according to the prior art, and according to the present invention.

The reference to Han et al. relied on by the Examiner is no different from Applicant's admitted prior art method of forming HSGs using a warm reaction chamber. As explained in detail in Applicant's original specification, in such a prior art technique, the source of the HSGs, i.e., the source gas, is introduced into the reaction chamber only after the ambient temperature of the reaction chamber is stabilized (page 4, lines 7 - 11). In the Office Action, the Examiner differentiates the Han et al. patent from Applicant's admitted prior art by stating that Han et al. "teaches ... introducing a first amount of source gas into the reacting chamber while an ambient temperature stabilizes". Such a position is respectfully traversed.

Han et al. teach, at col. 4, lines 12 - 22, that the temperature of the reaction chamber is brought up to 570° to 600° C., the temperature of the

chamber is **then** stabilized, and "[a] silicon source gas is **then** injected into the chamber so that silicon crystal nuclei are selectively formed" (emphasis supplied). And, although the Examiner alludes to Fig. 6 of Han et al., this figure clearly shows a step 300 of forming the silicon crystal nuclei after the step 250 of stabilizing the temperature of the reaction chamber. Han et al. make it quite clear, through their written description and drawings, that their warm wall technique involves the temperature of the reaction chamber being stabilized before any source gas is introduced into the chamber.

On the other hand, claims 1 and 14 are distinguishable from the Han et al. patent by requiring steps of forming HSG nuclei by introducing the source gas into the reacting chamber while the ambient temperature is stabilizing. Likewise, claim 7 distinguishes over the Han et al. patent by reciting a step of introducing source gas into the ambient to form hemispherical sections while a temperature of the substrate is stabilizing. Accordingly, the Han et al. patent can not anticipate claim 1, claim 7 or claim 14 under 35 USC 102.

Tatsumi et al. also teach a warm wall reaction chamber technique in which the temperature is stabilized before the source gas of the HSG is introduced. At col. 6, lines 33 - 38 Tatsumi et al. state that the substrate is heated to a constant temperature, "... and then, by supplying Si_2H_6 to the forming chamber ... nuclei ... are generated" (again, emphasis supplied). Thus, Tatsumi et al. also fail to suggest the above-identified steps of claims 1, 7 and 14.

Therefore, even assuming, *arguendo*, that Tatsumi et al. teach that internal pressure, temperature range and flow rate of source gas are each result-effective variables in the production of HSGs, the references to Han et al.

and Tatsumi et al. do not render the subject matter of claims 1, 7 and 14 obvious under 35 USC 103. That is, even assuming that one of ordinary skill in the art were somehow motivated to have incorporated the teachings of Tatsumi et al. into the method disclosed by Han et al., the resulting combination would still not meet Applicant's claimed invention as such a result would still be subject to the deficiencies discussed above with respect to Han et al.

It should further be noted that each of claims 1, 7 and 14 call for forming a second HSG nuclei or hemispherical section over the first HSG nuclei or hemispherical section by introducing a second source gas after the ambient temperature (claims 1 and 14) or the substrate temperature (claim 7) stabilizes. Each of dependent claims 2, 10 and 15 call for the amount of source gas introduced during this step to be larger than the amount of source gas introduced during the period while the temperature is stabilizing. Neither the Han et al. nor the Tatsumi et al. methods involve introducing source gas during these two discrete time periods, i.e., the period during which the temperature is stabilizing and the period after the temperature has stabilized.

Rather, Han et al. only teach lowering the stabilized temperature to grow the HSGs, whereas Tatsumi et al. teach increasing the stabilized temperature to ensure a small enough grain size. Neither of the references teach introducing different amounts of source gas pre- and post-stabilization, respectively. The present invention thus represents a difference in kind over what is taught by the references and as such, the references do not render obvious at least the subject matter of claims 1, 2, 7, 10, 14 and 15.

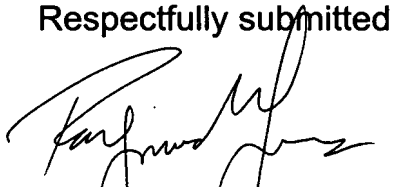
For these reasons, namely because of the differences between Applicant's claimed invention and the references, including the lack of

suggestion or disclosure in the references of a method in which HSG nuclei or hemispherical grains are formed by introducing the source gas while the ambient temperature or temperature of the substrate is stabilizing, the references can not anticipate or render obvious the subject matter of independent claims 1, 7 and 14. Accordingly, early reconsideration and allowance of the claims are respectfully requested.

In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact the undersigned at (703) 715-0870 in the Washington, D.C. area, to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,



Raymond Jones
Reg. No. 34,631

JONES VOLENTINE, L.L.P.
12200 Sunrise Valley Drive, Suite 150
Reston, Virginia 20191
(703) 715-0870
Dated: December 7, 1999